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## Operator REST\_SOUS\_STRUC

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### 1 Drank

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To restore in the physical base of the results in generalized coordinates.

This operator allows, from results on a system in generalized coordinates obtained by methods of modal recombination `tran_gene`, methods of under cyclic structuring `mode_cycl`, of dynamic structuring `mode_gene` or of harmonic structuring `harm_gene`, to restore the results in the initial physical system.

The product concept is a concept of the type:

- `dyna_trans` if the generalized results come from a computation by modal recombination or following the extrapolation of results of experimental measurements on a digital model (the concept of entry is of `tran_gene` type) or following the restitution of a concept `dyna_trans` on a new mesh of visualization,
- `mode_meca` following a computation by cyclic substructuring (`mode_cycl`), by dynamic substructuring (`mode_gene`) or if computation corresponds to the restitution of a concept `mode_meca` on a new mesh of visualization,
- `dyna_harmo` following a computation by harmonic substructuring (`harm_gene`),
- `evol_noli` following a nonlinear computation mixed with a modal computation on its nonlinear part

## 2 Syntax

```

resphy=REST_SOUS_STRUC                                [*]
(
  ◆/RESULTAT=resu                                     , [mode_meca]
                                                    [dyna_trans]
                                                    [evol_noli]

  /RESU_GENE =tg , / [tran_gene]
                                                    / [mode_cycl]
                                                    / [mode_gene]
                                                    / [harm_gene]

  ◇MODE_MECA=mode , [mode_meca]

  ◇ NUME_DDL=numeddl , [nume_ddl]

  ◇/TOUT_ORDRE = ' OUI',
    /NUME_ORDRE =num , [l_I]
    /NUME_MODE =num , [l_I]
    /TOUT_INST = ' OUI',
    /LIST_INST =list , [listr8]
    /INST =inst , [l_R]
    /FREQ =freq , [l_R]
    /LIST_FREQ=liste , [listr8]

  ◇/TOUT_CHAM = ' OUI',
    /NOM_CHAM = (| ' DEPL',
                | ' VITE',
                | ' ACCE', [DEFAULT]
                | ' ACCE_ABSOLU',
                | ' EFGE_ELNO',
                | ' SIPO_ELNO',
                | ' SIGM_ELNO',
                | ' FORC_NODA',),

  ◇INTERPOL = "LIN",
                / "NON", [DEFAULT]

  ◇CRITERE = "ABSOLU",
                / "RELATIF", [DEFAULT]

  ◇ accuracy =/prec , [R]
                /1.E-06 , [DEFAULT]

  ◇/SECTEUR =numsec , [I]
    /SQUELETTE =squel , [squelette]
    /SOUS_STRUC = nom_sstruc, [kN]

  ◇/NOEUD= lno, [l_co]
    /GROUP_NO = lgrno, [l_co]
    /MAILLE = lma, [l_co]
    /GROUP_MA = lgrma, [l_co]

```

```

    ◇ CYCLIQUE= _F (
        ◇ NB_SECTEUR = NS      [I]
        ◇ NUME_DIAMETRE = n1   [I]
        ◇ RESULTAT2 = LMBO     [evol_elas]
                                   [evol_noli]
                                   [dyna_trans]
                                   [evol_char]
                                   [mode_meca]

    ◇TITER =titer ,           [l_Kn]

    )

If RESU_GENE of the tran_gene type then [*] = dyna_trans
If RESU_GENE of the mode_cycl type then [*] = mode_meca
If RESU_GENE of the mode_gene type then [*] = mode_meca
If RESU_GENE of the harm_gene type then [*] = dyna_harmo
If RESULTAT of the mode_meca type then [*] = mode_meca
If RESULTAT of the evol_noli type then [*] = evol_noli
If RESULTAT of the dyna_trans type then [*] = dyna_trans
```

## 3 Operands

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### 3.1 Operands RESU\_GENE/RESULTAT

/RESU\_GENE = tg

- / concept of the `tran_gene` type containing for various times of the generalized vectors of standard displacement, velocity and acceleration of transient response calculated by under structuring.
- / concept of the `mode_cycl` type containing the generalized vectors of the modes calculated by under cyclic structuring.
- / concept of the `mode_gene` type containing the generalized vectors of the modes calculated by under dynamic structuring.
- / concept of the `harm_gene` type containing the generalized vectors of standard displacement, velocity and acceleration of the harmonic response D" a computed structure by under structuring.

/RESULTAT

This key word can be used when one initially restores result resulting from a computation by dynamic substructuring on a first squelette (mesh of visualization). One defines then an enriched squelette in which one amalgamated the nodes with the interfaces of under structures and recovered whole or part of the nodes groups or meshes of the initial mesh. The key word `result` corresponds then to the restitution of a concept `mode_meca`, `dyna_trans`, `evol_noli` on a new enriched squelette (cf example with [S4]).

### 3.2 Operand MODE\_MECA

◇MODE\_MECA = Concept

mode of the `mode_meca` type containing a base of eigen modes obtained by under - dynamic structuring.

This operand is used in the case of a restitution in the physical system of result of transient computation carried out on modal base calculated by dynamic substructuring. The modal base contained in the concept `mode_meca` was obtained by a preceding `REST_SOUS_STRUC`.

In this case, it is necessary to inform the same support of restitution (key word `SQUELETTE` or `SOUS-STRUC`) used for the restitution of modal base.

### 3.3 Operand NUME\_DDL

◇NUMÉRIQUE\_DDL = numeddl

Concept of the `nume_ddl` type containing a classification corresponding to a model reduced in the case of a computation with dynamic condensation when the user wishes a restitution on the degrees of freedom belonging to this small-scale model.

This operand thus makes it possible to obtain following the restitution a concept `mode_meca` which could be used thereafter for a computation on the model.

### 3.4 Operands TOUT\_ORDRE/NUME\_ORDRE/TOUT\_INST/LIST\_INST/INST

*Warning : The translation process used on this website is a "Machine Translation". It may be imprecise and inaccurate in whole or in part and is provided as a convenience.*

◇/TOUT\_ORDRE = "OUI"

on all to restore modes of the concept `mode_cycl` or `mode_gene`.

/NUME\_ORDRE = num

List of integers containing the numbers of the modes on which the restitution takes place.

/NUME\_MODE = num

List of integers containing the numbers of the modes in the total spectrum on which the restitution takes place.

/TOUT\_INST = "OUI"

If one wishes to restore on all the urgent contents as a result generalized (`tran_gene`).

/LIST\_INST = list

Lists increasing realities of `listr8 type` containing times for which one wishes to carry out the restitution.

/INST = inst

List of realities containing times over which the restitution takes place.

For a transient computation, it is checked that the times required by option `LIST_INST` are well in the field of definition of the `tran_gene`.

The results at one unspecified time can be obtained by linear interpolation between the two times results of computation actually contained by the `tran_gene`.

## 3.5 Operands `FREQ/LIST_FREQ`

These operands are used in the case of a restitution of generalized harmonic computations (`harm_gene`).

/FREQ = freq

Frequency to which one wishes to restore harmonic computation

/LIST\_FREQ = list

Lists realities containing the frequencies for which one wishes to carry out the restitution.

For each frequency indicated, one restores the fields obtained with the frequency of computation nearest. There is no interpolation.

## 3.6 Operands `TOUT_CHAM/NOM_CHAM`

◇/TOUT\_CHAM = "OUI"

Makes it possible to restore the fields of symbolic name `DEPL`, `QUICKLY` and `ACCE` contained as a result generalized (`tran_gene`, `harm_gene`).

/NOM\_CHAM = nomcha

List of symbolic names of field which one wishes to restore: "DEPL", "QUICKLY", "ACCE".

## 3.7 Operand INTERPOL

◇INTERPOL =

- "LIN" : an interpolation is authorized between two times; this interpolation is usable only between two times of computation, but can lead to errors if two times of archiving [U4.53.21] are separated from a very long time with respect to the periods of the studied phenomena.
- "NON" : the restitution must be made *stricto sensu*.

## 3.8 Operands accuracy/CRITERE

◇PRECISION = prec

◇CRITERE =

When INTERPOL is worth "NON" indicates with which accuracy the search of time to be restored must be made

- "ABSOLU" : interval of search [Inst - prec, Inst + prec],  
"RELATIF" : interval of search [(1 - prec). Inst, (1 + prec) . Inst]  
Inst being the time of restitution.

## 3.9 Operand SECTEUR

◇/SECTEUR

Number of sector of the cyclic structure on which result (of mode\_cycl type) will be restored in the physical system in cyclic substructuring.

## 3.10 Operand SQUELETTE

/SQUELETTE

Name of the mesh squelette of the total structure on which result will be restored: to see operator `DEFI_SQUELETTE` [U4.24.01].

## 3.11 Operand SOUS\_STRUC

/SOUS\_STRUC = nom\_sstruc

Name of the substructure on which result will be restored: to see operator `DEFI_MODELE_GENE` [U4.65.02].

## 3.12 Operand NOEUD/GROUP\_NO

◇ /NOEUD = lno  
/GROUP\_NO = lgrno  
/MAILLE = lma  
/GROUP\_MA = lgrma

After a computation of transient dynamics on modal base, the user can restore kinematical fields on a part only of the nodes or meshes of the mesh.

List names of the nodes/meshes or nodes groups/meshes corresponding to the places where the user wants to restore kinematical fields.

## 3.13 Operand CYCLIQUE

```
◇ CYCLIQUE = _F (
    ◇ NB_SECTEUR = NS [I]
    ◇ NUME_DIAMETRE = nl [I]
    ◇ RESULTAT2 = LMBO [evol_elas]
                                [evol_noli]
                                [dyna_trans]
                                [evol_char]
                                [mode_meca]
)
```

operator `DEFI_SQUELETTE` [U4.24.01] makes it possible to regenerate the complete mesh of a structure with cyclic symmetry starting from the mesh of a sector of this structure.

Option `CYCLIQUE` in `REST_SOUS_STRUC` makes it possible to restore on this new mesh squelette the fields at nodes calculated on the model of the only sector and taken into account of cyclic symmetry (with `LIAISON_MAIL` or `LIAISON_CYCL` for example).

The action of this option of `REST_SOUS_STRUC` consists:

- 1 in the static case (only one field with the provided node) to make turn this field at nodes on the mesh squelette
- 2 in the dynamic case (2 provided fields at nodes `RESULTAT` and `RESULTAT2`) to make the combination of the fields at nodes and the make turn on the new mesh.

## 3.14 Operand TITER

```
◇TITER = title
```

Titres attached to the product concept by this operator [U4.03.01].

## 4 Example: Restitution of a `mode_meca` on an enriched squelette, use of key word `RESULTAT`

One proposes Ci below an example of use of key word `RESULTAT`. The complete command file corresponds to the case test `SDLS106A`.

First stage: computation of the generalized eigen modes (obtained by dynamic substructuring) of total structure

```
resgen = MODE_ITER_SIMULT (MATR_RIGI = risgen,
                           MATR_MASS = masgen,
                           CALC_FREQ = _F (OPTION = "PLUS_PETITE",
                                             NMAX_FREQ = 6))
% definition of the first mesh of visualization of the quantities calculated
squel = DEFI_SQUELETTE (MODELE_GENE = modege,
                        SOUS_STRUC = _F (NOM = "carrel", TOUT = ' OUI'),
                        SOUS_STRUC = _F (NOM = "carre2", TOUT = ' OUI'))
% restitution of the mode_gene on this first squelette:
modglo = REST_SOUS_STRUC (RESU_GENE = resgen,
                          SQUELETTE = squel,
                          TOUT_ORDRE = "OUI", TOUT_CHAM = "OUI")
% definition of the enriched squelette in which one amalgamated the nodes with the interfaces of
under structures and recovered whole or part of the nodes groups or meshes of the initial mesh:
```

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```
squelbis = DEFI_SQUELETTE (MODELE_GENE = modege,  
                           SQUELETTE   = squel,  
                           RECO_GLOBAL = _F (TOUT=' OUI', DIST_REFE = 0.1))  
  
% restitution of the first mode_meca on the new squelette:  
modglbis = REST_SOUS_STRUC (SQUELETTE = squelbis,  
                             RESULTAT  = modglo)
```